**VOLUME & SURFACE AREA**

***Making a box***

1. Take a sheet of A4 paper.
2. From each corner, measure and cut out squares.
3. Fold up the sides to make a box.
4. *Without using a ruler*, and knowing that an A4 sheet of paper is 21 cm × 30 cm, calculate the width, length and height of your box.
5. Now calculate the volume and surface area of your box. Compare your volume and surface area with your classmates. Who was able to make the box with the greatest volume?

***Setting up a spreadsheet***

You are now going to set up a spreadsheet that will enable you to see what size square you need to cut out from an A4 sheet of paper to get the maximum volume.

1. Set up your spreadsheet as follows:

* Column A will be the square size
* Column B is the length of the box
* Column C is the width of the box
* Column D is the height of the box
* Column E is the volume of the box
* Column F is the surface area of the box

1. Column A: Under the heading, enter ‘1’. Use a formula to fill in the column in increments of one.
2. Column B: Use a formula to calculate the length of the box. Copy the formula down. Don’t forget that the length of the A4 paper is 30 cm.
3. Column C: Similarly, use a formula to calculate the width of the box. The width of the A4 paper is 21 cm.
4. Column D: Use a formula to find the height of the box.
5. Column E/F: Use a formula to find the volume and SA of the box.
6. Look at column E to find which square size will give you the maximum volume.
7. Change your spreadsheet so that you can find out which size squares you need to cut out to maximize volume to the nearest 0.5 cm.

TRY:

You must create a packaging that will have a volume of 250 cm3. It must satisfy the following requirements:

* It must be a rectangular prism.
* The base of the packaging must be a square.
* You must minimize the surface area needed for the packaging.

What dimensions, to the nearest 0.5 cm, will satisfy the above requirements? Use a spreadsheet to help you.